



**Regional Centre for Child and  
Adolescent Mental Health**

Eastern and Southern Norway

07.02.2019

This is the author's final draft post-refereeing article published in:

International journal of psychology. 2017 52(2):106-115

Hagen, K. A. and Ogden, T. (2017), Predictors of changes in child behaviour following parent management training: Child, context, and therapy factors

For publisher's version: doi: [10.1002/ijop.12365](https://doi.org/10.1002/ijop.12365)

The original publication is available at

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ijop.12365>

### Abstract

This non-randomized study examined a set of predictive factors of changes in child behavior following Parent Management Training (PMTO). Families of 331 Norwegian girls (26%) and boys with clinic-level conduct problems participated. The children ranged in age from 3 to 12 years ( $M_{\text{age}} = 8.69$ ). Retention rate was 72.2% at post assessment. Child-, parent-, and therapy level variables were entered as predictors of multi-informant reported change in externalizing behavior and social skills. Behavioral improvements following PMTO amounted to 1 standard deviation on parent rated and  $\frac{1}{2}$  standard deviation on teacher rated externalizing behavior, while social skills improvements were more modest. Results suggested that children with higher symptom scores and lower social skills score at pre-treatment were more likely to show improvements in these areas. According to both parent- and teacher-ratings, girls tended to show greater improvements in externalizing behavior and social skills following treatment and, according to parents, ADHD symptomology appeared to inhibit improvements in social skills. Finally, observed increases in parental skill encouragement, therapists' satisfaction with treatment and the number of hours spent in therapy by children were also positive and significant predictors of child outcomes.

*Keywords:* PARENT MANAGEMENT TRAINING, CHILD CONDUCT PROBLEMS, TREATMENT RESPONSE, SOCIAL SKILLS

## Predictors of changes in child behavior following parent management training:

### Child, Context, and Therapy Factors

Parent management training (PMT) has produced positive parent and child outcomes in clinical trials (e.g., Ogden & Amlund-Hagen, 2008), yet a number of children whose families enter therapy fail to improve following treatment. Due to heterogeneity in responses to PMT, identifying characteristics of the child, the family context, and the therapy that predict behavioral changes following treatment is an important objective for clinicians and researchers alike. The identification of such factors signals when treatment is likely to produce favorable results, but also under what conditions and for whom modifications of treatments may be applied. The purpose of the present study was to examine a set of possible predictors of behavioral improvement in children in a sample of Norwegian families who received PMT.

### **Parent Management Training (PMT)**

According to Patterson's (1986) social interaction learning theory, children's behavior is directly affected by parenting and over time, children and parents enter into transactional patterns that for some families can become coercive. Coercive cycles of family interaction take place when children's non-compliance and aggression are reinforced by parental responses to these behaviors (Forgatch, Patterson & Gewirtz, 2013). PMT was developed to help parents break or avoid these interactional sequences that often lead to escalation of misconduct. The Oregon version of PMT engages parents as agents of change for their children's behavior problems and supports them to increase positive parenting and reduce coercion (Forgatch et al., 2013). Numerous studies have reported the effects of PMT on conduct problems in children (see meta-analysis by Michelson, Davenport, Dretzke, Barlow, & Day, 2013). Although there are fewer studies that have examined PMT's effect on

children's social skills, results indicate improvements in this outcome as well (Sigmarsson, Thorlacius, Gumundsdottir, & DeGarmo, 2015). Extending results from previous clinical trials and observational studies, the current study examined the effects of a set of predictors at the child, family, and therapy level on changes in child behavior following PMT.

### **Child level predictors**

Severity of symptoms at pre-treatment is a child level factor that has been found to relate positively to therapeutic change across interventions for child conduct problems. (e.g., Hemphill & Littlefield, 2006, Reid, Webster-Stratton & Baydar, 2004). Shelleby and Shaw (2012) concluded from their review that greater levels of problematic child behavior at intake were associated with more positive clinical outcomes; those who need it the most, benefit the most. Although regression to the mean may occur in observational studies, it makes sense that children and families who struggle the most have more to gain from treatment. It is important, however, to differentiate between *an absolute change score* and a child's *end score*, because a child who shows the greatest change may still have the highest symptom score post intervention (Kazdin & Whitley, 2006).

Co-morbidity in general may be associated with greater therapeutic change (Kazdin & Whitley, 2006), but in cases of ADHD specifically, some studies have shown that ADHD impedes therapeutic gains (e.g. Hemphill & Littlefield, 2006). Others, such as Beauchine, Webster-Stratton and Reid (2005) found that attention problems combined with conduct disorder neither moderated, nor predicted outcomes of group-based parent training. Thus, we expected that if ADHD comorbidity predicted behavioral change, it would do so negatively.

Some studies have suggested that younger children gain more from parent-focused interventions than do older children (McMahon & Forehand, 2003a, Ogden & Amlund-Hagen, 2008). Dishion and Patterson (1992) however, found that age neither predicted nor moderated outcomes of parenting interventions. Based on their review, Hipwell and Loeber

(2006) concluded that parent management training appeared to be effective for both boys and girls. In older age groups, 9-12 years, girls were found to benefit equally well from the intervention compared to boys in the same age range (Kazdin & Crowley, 1997). Results regarding the effects of children's age and gender thus seem to be inconclusive.

Less often studied child level predictors of treatment outcomes are child competencies. No study has, to our knowledge, examined initial levels of social skills specifically as a predictor of treatment outcome. Without also strengthening a child's social skills the child may be more inclined to fall back into old antisocial patterns because social skills help sustain positive adjustment. Deficiencies in social competence likely plays a role in both the development and maintenance of behavioral problems, and improving one's social skills is beneficial to the reduction of behavioral problems and vice versa. Moreover, 3 of the 5 parenting dimensions in PMTO (positive involvement, problem solving and skill encouragement) target parental behaviors that are meant to promote competence and skills in children. For these reasons, social skills, as rated by both parents and teachers were considered important outcomes in the current study.

Finally, early health risk, such as prematurity, has been identified as a risk factor for later problems in several developmental domains (Rose, Feldman, Rose, & Wallace, 1992). Whether it affects behavioral changes following treatment has not been tested thus far. In this study, we examined whether early health risk, in addition to age, gender, ADHD-comorbidity and pre-treatment externalizing symptomology and social skills, predicted behavioral adjustment following treatment.

### **Family level predictors**

Familial disadvantage, in general, has been found to relate positively to treatment response to parent training. For example, low socioeconomic status (MacKenzie, Fite, &

Bates, 2004), and educational attainment (Gardner et al., 2009) were predictive of therapeutic gains. Single parenthood, however, was related to less favorable outcomes in children following treatment in several intervention studies (Beauchaine et al., 2005; Gardner et al., 2009; Hahlweg, Heinrichs, Kuschel, Bertram, & Naumann, 2010), whereas in a meta-analysis by Serketich and Dumas (1996), marital status was unrelated to parenting intervention effects sizes. For predictors such as parental depression, results are also inconsistent. In some studies, maternal depression has been found to impede treatment response (Reyno & McGrath, 2006), whereas Webster-Stratton and colleagues found maternal depression to be unrelated to therapeutic change (Baydar, Reid, & Webster-Stratton, 2003). Depressive symptoms in parents may influence the way children's behavior is perceived, underscoring the importance of including multi-informant assessments.

For parenting skills, it appears that initial levels are related to therapeutic gains in children (Reid, et al 2004), although *improvements* in parenting over the course of treatment may be equally or more important. The most favorable treatment outcomes in Beauchaine et al.'s (2005) study were observed in children whose parents scored lower on effective parenting practices at intake but who improved over the course of treatment. In the present study, we examined the effects of marital status, mothers' and fathers' depressive symptoms, and improvements in parenting skills on behavioral outcomes.

### **Therapy Factors**

Dosage may influence how much families are able to benefit from treatment, though there are exceptions. Hahlweg et al. (2010) found that in two-parent families, fathers increased their positive behavior and decreased their dysfunctional parenting, even if only 7 per cent of them had participated in the training. In addition to dosage, characteristics of the therapy also play a role. Therapeutic alliance is considered a common factor at play across different therapeutic approaches, but only a few studies of alliance have been conducted in the

context of Parent Management Training (PMT; Kazdin & Whitley, 2006; Kazdin & Durbin, 2012). Measures of competent adherence to the PMT called FIMP (Fidelity of Implementation System) has been examined in studies by Forgatch and DeGarmo (2011). These studies showed that higher fidelity scores yielded significantly greater improvements in parenting practices.

Studies of client satisfaction with treatment outcomes, therapists, treatment procedures and teaching format in PMT have generally documented positive outcomes (McMahon & Forehand, 1983b). These indices may, however, also be indications of how well the therapist cooperates with the parents, rather than of behavioral improvements in the children. The predictive value of *therapist's* satisfaction with treatment in PMT is an interesting measure because the therapist does not directly treat the child whose behavior treatment success is partly measured by.

In the present study, we examined the effects of dosage (hours spent in therapy by parents and children), therapeutic alliance, and treatment satisfaction rated by both parent and therapist.

### **The current study**

In the current study we investigated a broad set of potential predictors of four different measures of child outcomes following treatment. Children's social skills, early health risk, and therapists' satisfaction with treatment have not been tested before. Outcomes were change scores on key child variables; externalizing behavior and social skills, as rated by parents and teachers. While there are other indices of clinical significance (e.g., cut-offs, reliable change), our focus was on children's change scores (as predicted by child, family and therapy factors). Several of the predictors have been investigated in earlier studies, but they have not

previously been examined in the same study, in which their relative effects have been determined.

## **Method**

### **Participants**

Participants were 331 children, 85 girls (26%) and 246 boys, and their parents. At intake, the children ranged in age from 3 to 12 years ( $M_{\text{age}} = 8.69$ ,  $SD = 2.14$ ). At treatment termination, 239 (72.2%) families were retained and the average age of the children was  $M_{\text{age}} = 9.71$ ,  $SD = 2.08$ ). The mean annual family income was NOK 420,230 ( $SD = 223,161$ , approximately \$70,000,  $SD = \$37,193$ ), which in Norway represents a middle-income level. Thirty-eight percent were single parents and 28% of the families received welfare.

The families had themselves contacted or been referred to child welfare or child mental health services because of child conduct problems. The child's behavior could be any behavior consistent with the symptoms of Oppositional Defiant Disorder (ODD) or Conduct Disorder (CD), such as aggression, delinquency, or disruptive classroom behavior. Inclusion to the study was based on clinical judgments of the therapists, as would normally be the case for the agencies. Based on normative scores adjusted for age and gender, the mean T-scores at intake were 77.48 ( $SD = 15.27$ ) and 74.25 ( $SD = 20.87$ ) for the CBCL and TRF externalizing scales, respectively, suggesting that the participating children had serious conduct problems.

Of the 224 children for whom diagnostic information was available, 77 (34%) children had been diagnosed with ADHD. However, because referrals were based on clinical judgments, not diagnostic criteria, there is a possibility of false negatives in the sample. Exclusion criteria were autism, severe mental retardation, documented sexual abuse, or custodial parents with severe mental retardation or psychopathology. No family was excluded based on these restrictions.



One-hundred-and-thirty-four PMTO therapists participated in the study, treating 1 – 6 families each. The length of therapy in weeks ranged from 8 to 110 ( $M_{\text{weeks}} = 42.65$ ,  $SD = 17.69$ ). Mothers spent an average of 23.8 hours in therapy, fathers 13.7 hours and children 2.1 hours.

### **Procedure**

Families were recruited through regular child welfare and mental health services. Written consent was obtained from the parents, and with their agreement, the children's teachers were contacted and asked to contribute with child assessments. Therapists collected the data from the parents and teachers' data were mailed. The recruitment period lasted from January 2001 to April 2005. Post-treatment assessments were conducted between October 2001 and May 2006. Fifty-nine of the families (of 331) participated in an earlier randomized controlled trial of PMTO (Ogden & Amlund-Hagen, 2008). The study and the treatment protocol were approved by the regional committee for medical research.

### **Intervention**

PMTO is designed to help parents change through a) increased use of positive teaching strategies for pro-social behavior and b) contingent use of mild negative consequences for deviant behavior (e.g., removal of privileges). Therapists help parents enhance five central parenting dimensions: skill encouragement, monitoring, problem solving, positive involvement, and effective discipline. Families were treated individually, and typical sessions included role-playing of new skills, exercises, troubleshooting and discussing new homework assignments. Between sessions, parents were followed-up with a telephone call. PMTO therapists had 18 months of training and completed 3-5 full-scale training therapies prior to certification.

### **Measures**

*Child behavior checklist (CBCL) and teacher report form (TRF, Achenbach, 1991).*

Parents and teachers completed the CBCL and TRF, respectively. The externalizing scale was used in the present study. Items were rated on a 3-point Likert scale, where higher scores represent greater symptomatology. Alpha coefficients at pre- and post-assessments were all within acceptable range (.88 - .96). Change scores were calculated by subtracting post-scores from intake scores, so that greater change scores indicated greater reductions in externalizing behaviour.

*Social skills rating system (SSRS, Gresham & Elliott, 1990)* is a standardized, multi-rater instrument that assesses social skills in children. In the parent (38 items) and teacher versions (30 items), pre and post alphas ranged from .87 to .89. Higher scores indicate greater social skills. Change scores were calculated by subtracting intake scores from post-scores, so that greater change-scores indicated greater improvements in social skills.

*Coder's impression (CI).* Observed assessment of videotaped structured interaction tasks (SIT) were recorded at each participating agency. Coders completed a global rating inventory, the Coder's Impression (CI, Forgatch, Knutson, & Mayne, 1992), immediately after having observed the families in the SIT. The five parenting skills, *discipline, problem solving, monitoring, positive involvement* and *skill encouragement* were scored using this rating system. Reliability alphas ranged from .67 to .98. An exception was the monitoring sub-scale which was excluded because the reliability alphas were considered too low and thus unreliable.

*Early Health Risk, the Norwegian Parent Information Questionnaire* contained eight 'yes' or 'no' questions about the child's health history, injuries, and early risk, including prematurity and low birth weight (< 2500 g). Parents of 115 children reported one or more (from 1 to 4) early health risk factors, whereas parents of 190 children reported none. Information was missing for 26 children (8%).

*The Symptom Checklist-5 (SCL-5)* is a five-item scale based on the SCL-25 (see Ogden & Hagen, 2008) and measured symptoms of anxiety and depression in mothers and fathers. Items focused on feelings of hopelessness, worrying and feeling rejected. The response alternatives ranged from 1 to 5, in which higher scores indicated more symptoms. Reliability alphas ranged from .86 to .89 (for mothers and fathers at pre- and post-intervention).

*Therapeutic alliance.* Therapeutic alliance was assessed with the Working Alliance Inventory 12-item Short form (WAI-S; see Ogden & Hagen, 2008). Primary caregivers were asked after the 3<sup>rd</sup>, 12<sup>th</sup> and the 20<sup>th</sup> therapy session to rate each statement (e.g., “I trust the therapist's ability to help me”) on a 7-point Likert scale, where higher scores indicated greater alliance. Sum-scores across all three sessions were used. The reliability coefficient was .83.

*Family and Therapist Satisfaction Survey* (Lubrecht, 1992) was completed by caregivers to indicate how satisfied they were with the treatment. Parents rated 12 items about the quality of their interaction with the treatment, therapist, whether they recommended the treatment to others ( $\alpha = .80$ ). A 9-item questionnaire with slightly different questions was answered by the therapists to indicate how satisfied they were with the therapy ( $\alpha = .73$ ).

### **Defining treatment outcomes and analytic procedure**

The four outcome variables were: 1) improvements on CBCL externalizing raw scores, 2) improvements on TRF externalizing raw scores, 3) improvements in average parent-rated social skills, and 4) improvements in average teacher-rated social skills.

Missing data were handled by running multiple imputation models using Bayesian estimation, in which all variables subject to analyses were included. Ten imputed data sets were created. Regression analyses were carried out for each new dataset. Parameter estimates were first calculated in each new data set and then pooled. Standard errors were calculated by using the average of the standard errors from each of the new datasets and the between analysis parameter estimate variation (Mplus, Muthen & Muthen, 1998-2010).

Because therapists in many cases treated more than one family, their individual scores on treatment satisfaction may not be considered independent of each other. Thus, for the regression models with therapists' rating of treatment satisfaction we used the MLR estimator which is more robust against non-independence. The four change scores as described above were regressed on each set of potential predictors. Regression models were first ran separately for each level of predictor (child, family and therapy), in which all potential predictors at one level were entered simultaneously. Pre-treatment scores of the outcomes were entered as control variables in all models. Finally, models entering all potential factors were ran in full models.

## **Results**

### **Attrition analysis**

A series of one-way ANOVAs were conducted to test if families lost to attrition (n=93) scored significantly different at intake (baseline) than those who remained in the study. A few differences emerged; Families whose children had higher initial TRF externalizing scores and whose fathers spent more hours in treatment were more likely to be retained. No other significant differences were found between families who dropped out of the study and those retained, on any of the other predictor variables.

### **Descriptive statistics of outcome variables**

Means, standard deviations and correlations for all study variables are presented in Table 1. In terms of T-scores results showed that, on average, children reduced their parent-rated externalizing problems (CBCL) by 12.77 which is more than a standard deviation. Children improved on average .14 points on the parent-reported social skills measure. The children reduced their teacher reported externalizing problems (TRF T-scores) on average by

5.17 about a half of a standard deviation. The average improvement on teacher-rated social skills was .02, which was non-significant.

Using a T-score of 60 as a relevant cut-off, the number of children who scored above this cut-off on the parent reported externalizing scale was reduced from 87 to 62% following PMT. For the teacher reported externalizing scale, the numbers were 67% to 58% for pre-and post-treatment, respectively. Although higher initial levels of problem behavior were predictive of greater behavioral changes, children who had lower T-scores pre-treatment, were more likely to score below the cut-off post-treatment. Following treatment, 86% of the children showed improvements according to parent ratings of externalizing, and 60% showed improvements on the TRF. Forty percent of the children changed in a positive direction from pre- to post treatment as rated by both parents and teachers.

### **Prediction models**

#### *Predicting parent- and teacher reported improvements in externalizing behavior.*

According to the regression models, improvements in CBCL externalizing scores were significantly predicted by gender ( $\beta = .13$ ,  $p < .04$ ), and pre-treatment externalizing score ( $\beta = .42$ ,  $p < .00$ , Table 2a). That is, girls and children who were rated as having more behavioral problems improved more following treatment. Improvements on the TRF externalizing scale were significantly predicted by gender (being a girl,  $\beta = .17$ ,  $p < .01$ ) and teacher rated externalizing at intake only ( $\beta = .54$ ,  $p < .01$ ). No other child-level variable predicted change in parent or teacher-rated externalizing behavior.

No variables at the family level predicted parent-rated changes in externalizing behavior. Improvements in parents' skill encouragement were, however, significantly predictive ( $\beta = .214$ ,  $p = .05$ ) of improvements in teacher-rated externalizing behavior.

Among therapy-level predictors, satisfaction with treatment as rated by the therapists ( $\beta = .20, p < .01$ ), therapeutic alliance as rated by mothers ( $\beta = .16, p = .04$ ), and hours spent in treatment by the children ( $\beta = .24, p < .00$ ) were positively associated with changes in parent-rated externalizing behavior. Number of hours spent in treatment *by mother* also predicted parent-rated changes in externalizing behavior, though negatively, ( $\beta = -.20, p < .01$ ) indicating that greater dosage was associated with less change in this outcome. None of the therapy-level factors predicted changes in teacher-reported externalizing scores.

Entering all predictors at the child, family and therapy level simultaneously in the full models predicting parent and teacher rated changes in externalizing behavior did not change any of the predictors' significance, with two exceptions; Fathers' time spent in therapy emerged as a significant predictor of parent rated changes in externalizing behavior ( $p < .05$ ), and improvements in parental skill encouragement, was no longer significant in the full model predicting teacher-rated externalizing.

*Predicting parent- and teacher reported improvements in social skills.* Parent-reported improvements in social skills were significantly predicted by pre-treatment social skills as rated by parents ( $\beta = -.35, p < .001$ ), and by ADHD comorbidity ( $\beta = -.12, p = .029$ ; Table 3a and 3b). That is, lower parent-rated social skills score prior to therapy and not having an ADHD diagnosis were associated with greater the improvements in social skills. Teacher-reported improvements in social skills were significantly predicted by pre-treatment social skills as rated by teachers ( $\beta = -.52, p < .001$ ), and by gender ( $\beta = .19, p = .009$ ). Girls and children with lower pre-treatment social skills scores improved more.

No family-level factors predicted improvements in social skills, as rated by either parents or teachers. In the regression models with therapy-level factors, hours spent in therapy by mothers ( $\beta = -.20, p = .024$ ), therapists' satisfaction with treatment ( $\beta = .14, p = .038$ ), and

mothers' satisfaction with treatment ( $\beta = .19, p = .009$ ) were predictive of parent-rated improvements in social skills. No therapy-level factors predicted teacher-rated improvements in social skills.

When all factors were entered simultaneously in the full models predicting changes in parent- and teacher-rated social skills, improvements in skill encouragement emerged as a significant predictor of parent-rated changes in social skills ( $p < .05$ ) and therapists' satisfaction with treatment was significantly predictive of teacher-rated improvements in social skills ( $p < .05$ ). There were no other changes in any parameter's significance-level for the parent- or teachers rated changes in social skills in the full model.

### **Discussion**

Results from this study showed a reduction in child externalizing problems according to both parent and teacher ratings. Positive, but modest improvements were also registered for social skills as assessed by parents. Overall, children with greater behavioral and social deficiencies pre-intervention showed greater gains, as reported by both parents and teachers. Pre-scores of the outcome in question were in all four models (2a and b, 3a and b) the strongest predictor, and remained as such when testing the full models entering all factors simultaneously. This is a common finding in the literature and there are several ways of interpreting this result. Children with the highest scores have the greatest potential to change and because all families in this study received PMT we cannot rule out the possibility of regression to mean. On the other hand, one could argue that these children show the greatest progress because the PMTO intervention fits their families particularly well and because they have the most to gain from such treatment.

In three of the four models, girls improved more than did boys (parent-reported changes in social skills were the only exception). Earlier studies have indicated that girls

benefit equally well from parent training interventions compared to boys (e.g., Hipwell and Loeber, 2006), our findings suggest that girls may actually benefit more than boys.

A third factor that repeatedly showed positive effects was therapists' satisfaction with treatment. This factor predicted parent-rated improvements in both externalizing behavior and social skills, and teacher-rated improvements in social skills in the full model and marginally ( $p = .08$ ) in the reduced model. This important finding confirms that PMT therapists appear to be decent judges of treatment to the families. Even if they have limited contact with the child, their perception of treatment success seems fairly accurate. When children do participate in treatment, results from this study indicate that it is associated with better outcomes. In the model predicting parent-rated changes in social skills, mothers' satisfaction with treatment was also associated with better outcomes, even in the full model.

The number of hours spent in treatment by the mothers was predictive of less parent-rated change in externalizing behavior. A curvilinear relationship between hours in treatment and outcomes may explain this finding. Some families met with the therapist up to 56 hours, and this may reflect multi-problem families in which behavioral improvement was hard to achieve. Perhaps more services, and help in additional or other domains (welfare, job seeking, parental mental health services, marital counseling) may be needed. Fathers spent on average 13.7 hours in treatment and their involvement was predictive of positive child behavioral changes. This finding emerged in the full model only, and therefore the possibility of a spurious effect cannot be ruled out.

An interesting illustration of a positive generalization effect was that improvements in the observed parental *skill encouragement* predicted improvements in teacher-rated externalizing behavior. In other words, parents' skills promotion appeared to transfer from the home context to the school or kindergarten setting. Better skill encouragement by parents was



also a marginally predictive of parent-rated changes in social skills. In the full models, however, better skill encouragement became a significant predictor of parent-rated social skills, but turned non-significant in the teacher-reported externalizing model. The only other significant predictor of teacher-rated changes in externalizing behavior, apart from pre-treatment externalizing scores, was gender. It may be the case then, that parents were better at encouraging skills in their daughters and that once gender entered the equation, it accounted for most of the variance.

ADHD comorbidity impeded improvements in social skills according to parents, but did not affect any of the other outcomes. This corresponds with Hemphill and Littlefield (2006) who found that attention problems inhibited therapeutic improvements in school behaviors.

Therapeutic alliance predicted parent-rated improvements in externalizing behavior, and remained significant in the full model, a positive finding that corresponds to those of Hogue et al. (2006). Alliance is probably a necessary ingredient for treatment gains, but likely not sufficient.

Marital status did not predict any outcomes. The outcomes show that PMTO may be adaptable to the needs of both single- and two-parent families. Moreover, the economic support of single-parent families is relatively generous in Norway, which may help explain why this variable did not significantly predict outcomes in any of the models. Maternal or paternal depression did not predict any of the child outcomes, a finding that may indicate that moderate mental health issues in parents are not incompatible with participating in or benefitting from parent training.

## **Limitations**

Families most likely to be retained in the study had children who scored higher on teacher-rated externalizing problems at intake and fathers who spent more time in treatment. These predictors of retention were also predictors of treatment outcomes, which may warrant caution when interpreting results about these predictors, in particular. It is important to emphasize that this study was carried out in regular service agencies. Diagnostic history and background information is notoriously incomplete in many cases and so while the findings regarding ADHD should be interpreted with some caution, the results nevertheless draw a fairly representative picture of the children and families recruited to this study.

Because all the children and their families in this study underwent treatment, we can not rule out respondent bias, child maturation or, as noted, regression to the mean. Still, the study allowed for the identification of the relative importance of several child, family and therapy factors in the predictions of change in child behavior. Finally, because this study was not a randomized controlled trial, we describe outcomes as changes in child behavior following PMT, as we cannot infer that the improvements are a result of the intervention.

### **Conclusion**

The discovery of predictors of successful outcomes can improve the precision of when to offer parent training and consequently increase the chances of good outcomes. Furthermore, this identification also helps signal when and for whom different treatments, modified protocols or multiple-treatment combinations should be applied.

## References:

- Achenbach, T. M. (1991). *Integrative guide for the 1991 CBCL/4-18, YSR and TRF profiles*. Burlington: University of Vermont, Department of Psychiatry.
- Beauchine, T. P., Webster-Stratton, C., & Reid, M.J. (2005). Mediators, moderators and predictors of 1-year outcomes among children treated for early-onset conduct problems: A latent growth curve analysis. *Journal of Consulting and Clinical Psychology, 73*, 371-388.
- Baydar, N., Reid, M. J., & Webster-Stratton, C. (2003). The Role of Mental Health Factors and Program Engagement in the Effectiveness of a Preventive Parenting Program for Head Start Mothers. *Child Development, 74*, 1433-1453.
- Dishion, T. J., & Patterson, G. R. (1992). Age effects in parent training outcome. *Journal of Behavior Therapy, 23*, 719-729.
- Forgatch, M.S., & DeGarmo, D.S. (2011). Sustaining fidelity following the nationwide PMTO implementation in Norway. *Prevention Science, 12*, 235-246.
- Forgatch, M. S., Knutson, N., & Mayne, T. (1992). *Coder impressions of ODS lab tasks*. Eugene: Oregon Social Learning Center.
- Forgatch, M.S., Patterson, G.R., & Gewirtz, A.H. (2103). Looking forward: The promise of widespread implementation of parent training programs. *Perspectives on Psychological Science, 8* (6) 682-694.
- Gardner, F, Connell, A, Trentacosta C, Shaw, D., Dishion, T, Wilson, M. (2009). Moderators of outcome in a brief family-centred intervention for preventing early problem behaviour. *Journal of Consulting and Clinical Psychology, 77*, 543-553.
- Gresham, F. M., & Elliott, S. N. (1990). *Social Skills Rating System*. American Guidance Service, Inc. Circle Pines, MN.

- Hahlweg, K., Heinrichs, M., Kuschel, A., Bertram, H., & Neuman, S. (2010). Long-term outcome of a randomized controlled universal prevention trial through a positive parenting program: is it worth the effort? *Child and Adolescent Psychiatry & Mental Health, 4*, 1-14.
- Hemphill, S.A. & Littlefield, L. (2006). Child and family predictors of therapy outcome for children with behavioral and emotional problems. *Child Psychiatry and Human Development, 36*, 329-349.
- Hipwell, A.E., & Loeber, R. (2006). Do we know which interventions are effective for disruptive and delinquent girls? *Clinical Child and Family Psychology Review, 9*, 221-255.
- Hogue, A., Dauber, S., Stambaugh, L.F., Cecero, J. J., & Liddle, H. A. (2006). Early therapeutic alliance and treatment outcome in individual and family therapy for adolescent behavior problems. *Journal of Consulting and Clinical Psychology, 74*, 121-129.
- Kazdin, A. E., & Crowley, M. J. (1997). Moderators of treatment outcome in cognitively based treatment of antisocial children. *Cognitive Therapy and Research, 21*, 185–207.
- Kazdin, A.E., & Durbin, K. A. (2012). Predictors of child–therapist alliance in cognitive–behavioral treatment of children referred for oppositional and antisocial behavior. *Psychotherapy, 49*, 202-217.
- Kazdin, A. E., & Whitley, M. K. (2006). Comorbidity, case complexity of evidence-based treatment for children referred for disruptive behavior. *Journal of Consulting and Clinical Psychology, 74*, 455 – 467.

- Lubrecht, J. (1992). Family Satisfaction Survey. In K. Kutash & T. R. Rivera (Eds.), *Measures of Satisfaction with Child Mental Health Services*. Unpublished manuscript, Florida Mental Health Institute, University of South Florida.
- McMahon, R. J., & Forehand, R. L. (2003a). *Helping the noncompliant child: Family-based treatment for oppositional behavior* (2nd Ed.), New York: The Guilford
- McMahon, R.J., & Forehand, R.L. (2003b). Consumer satisfaction in behavioral treatment of children: Types, issues and recommendations. *Behavior Therapy, 14*, 209-225.
- MacKenzie, E. P., Fite, P. J., Bates, J. E. (2004). Predicting Outcome in Behavioral Parent Training: Expected and Unexpected Results. *Child and Family Behavior Therapy, 26*, 37-53.
- Michelson, D., Davenport, C., Dretzke, J., Barlow, J., & Day, C. (2013). Do evidence-based interventions work when tested in the "real world?" A systematic review and meta-analysis of parent management training for the treatment of child disruptive behavior. *Clinical Child and Family Psychology Review, 16*, 18-34.
- Muthén, L.K. and Muthén, B.O. (1998-2010). Mplus User's Guide. Sixth Edition. Los Angeles, CA: Muthén & Muthen.
- Ogden, T. & Amlund-Hagen, K. (2008). Treatment effectiveness of Parent Management Training in Norway: A randomized controlled trial of children with conduct problems. *Journal of Consulting and Clinical Psychology, 76*, 607-621.

Patterson, G. R. (1986). Performance models for antisocial boys. *American Psychologist*, *41*, 432-444.

Reid, M.J., Webster-Stratton, C. & Baydar, N. (2004). Halting the Development of Conduct Problems in Head Start Children: The Effects of Parent Training, *Journal of Clinical Child & Adolescent Psychology*, *33*, 279-291.

Reyno, S. M. & McGrath, P. J. (2006). Predictors of parent training efficacy for child externalizing behaviour problems – a meta-analytic review. *Journal of Child Psychology and Psychiatry*, *47*, 99-111.

Rose, S. A., Feldman, J. F. Rose, S. L., Wallace, I. F. & McCarton, C. (1992). Behavior problems at 3 and 6 years: Prevalence and continuity in full-terms and preterms. *Development and Psychopathology*, *4*(3), 361-374.

Serketich, W.J., & Dumas, J.E. (1996). The effectiveness of behavioural parent training to modify antisocial behaviour in children: A meta-analysis. *Behavior Therapy*, *27*, 171-186.

Shelleby, E.C., & Shaw, D.S. (2012). Outcomes of parenting interventions for child conduct problems: A review of differential effectiveness. *Child Psychiatry and Human Development*, DOI 10.1007/s10578-013-0431-5

Sigmarsdottir, M., Thorlacius, O., Gumundsdottir, E. V., DeGarmo, D.S. (2015).

Treatment effectiveness of PMTO for children's behavior problems in Iceland: Child outcomes in a nationwide randomized controlled trial. *Family Process*, *54*, 498-517.

Table 1. Means, standard deviations and bivariate correlations of all variables (N = 331)

Variable	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Age(1)	8.69(2.14)	1																											
Gender(2)	26%(girls)	-.03	1																										
Civil Status(3)	38%(single)	.01	-.09	1																									
Hours_Mother(4)	23.8(8.7)	.02	-.12	-.02	1																								
Hours_Father(5)	13.7(11.8)	-.04	-.04	.40	.24	1																							
Hours_Child(6)	2.1(2.0)	.09	-.09	.00	.26	.18	1																						
ADHD (7)	34 %	.08	-.22	.06	-.01	.05	-.06	1																					
Health_Risk(8)	.6(.9)	.06	-.04	-.09	.12	.00	-.13	.04	1																				
T1_Ext_Parent(9)	23.81(9.32)	.15	-.11	.04	.15	-.09	.00	.13	.07	1																			
ChangeExt_Parent(10)	7.26(9.05)	.13	.08	-.06	-.02	.06	.18	.03	.12	.42	1																		
T1_SocSkil_Parent(11)	2.34(0.31)	-.09	.07	-.09	-.07	-.09	-.03	-.06	.06	-.41	-.07	1																	
ChangeSocSkil_Parent(12)	0.14(0.27)	-.05	.11	-.02	-.07	-.05	.04	-.13	.04	.15	.44	-.32	1																
T1_Ext_Teacher(13)	21.02(15.48)	.08	-.34	-.10	.12	.11	.12	.18	-.08	.30	.09	-.03	-.05	1															
ChangeExt_Teacher(14)	2.34(12.93)	.02	-.01	-.11	.06	-.06	.06	.01	.00	.17	.29	.09	.11	.47	1														
T1_SocSkil_Teacher(15)	2.32(0.36)	-.09	.29	.07	-.10	.03	-.08	-.16	-.00	-.20	-.07	.25	.03	-.51	-.29	1													
ChangeSocSkil_Teacher(16)	0.02(0.33)	.02	.05	-.08	.12	-.05	-.02	-.01	.05	-.04	.15	.08	.04	.09	.34	-.46	1												
Dep/Anx_Mother(17)	1.83(0.85)	.03	.07	-.25	.13	-.32	.00	-.13	.05	.11	-.04	-.07	.06	-.05	.08	-.02	-.01	1											
Dep/Anx_Father(18)	1.82(0.77)	.21	.10	-.06	-.11	.11	.10	.05	-.06	.13	.02	-.13	.07	-.06	-.02	.01	-.03	.24	1										
Change_Discipline(19)	0.25(.64)	-.14	-.11	.05	.02	-.04	-.11	-.10	.00	-.01	.04	.03	.05	.06	-.02	.09	-.12	.00	-.14	1									
Change_ProbSolv(20)	0.08(0.61)	.01	.00	-.05	.02	.04	-.07	-.13	-.03	.04	.06	.08	-.03	.09	-.10	.11	-.05	-.08	-.01	.49	1								
Change_PosInv(21)	0.12(0.65)	-.07	.06	.06	.05	.03	-.10	-.09	-.11	.00	.08	.09	.00	-.01	-.12	.16	-.10	-.03	.03	.59	.74	1							
Change_SkillEnc(22)	0.10(0.76)	.01	.05	.03	.16	-.01	-.07	-.08	-.14	.06	.10	.09	.06	.13	.05	.05	.01	-.01	-.04	.51	.62	.75	1						
Tx_Satis_Therapist(23)	3.27(0.39)	-.09	.02	-.05	.24	.14	.04	.10	.09	.05	.25	.13	.15	.09	.07	.08	.05	-.09	-.10	.11	.17	.21	.19	1					
Tx_Satis_Mother(24)	3.56(0.33)	-.11	.04	-.14	.30	.09	.02	-.09	.13	-.01	.14	.13	.18	.08	.06	.04	-.02	-.04	-.04	.10	.24	.23	.27	.54	1				
Alliance_Mother(25)	6.30(0.50)	.08	.13	-.11	.13	.00	-.07	-.03	-.05	.00	.19	.12	.11	-.02	.03	.02	.02	.02	.01	-.08	.10	.07	.14	.29	.47	1			
T3_Ext_Parent(26)	16.36(9.86)	.09	-.21	.05	.18	-.07	-.04	.11	-.05	.56	-.51	-.29	-.28	.24	-.11	-.15	-.13	.12	.06	-.02	.05	-.03	.00	-.21	-.14	-.13	1		
T3_SocSkil_Parent(27)	2.47(.34)	-.13	.15	-.10	-.09	-.14	-.01	-.15	.08	-.24	.30	.64	.49	-.04	.16	.27	.11	-.01	-.05	.10	.08	.11	.14	.24	.25	.21	-.50	1	
T3_Ext_Teacher(28)	18.22(15.04)	.04	-.33	-.07	.01	.06	.02	.12	-.12	.12	-.25	-.08	-.13	.62	-.40	-.27	-.21	-.06	.02	.08	.16	.06	.02	-.07	-.02	-.09	.34	-.18	1
T3_SocSkil_Teacher(29)	2.34(.36)	-.07	.26	.02	.01	-.02	-.08	.18	.06	-.20	.08	.29	.11	-.45	-.02	.58	.47	-.06	.03	.01	.05	.09	.08	.13	.02	-.01	-.26	.36	-.45

Note: Gender is coded 1=boys/2 =girls, Civil Status is coded 0=single/1= two-parent, ADHD is coded 0=no/1=yes, Hours = hours in therapy, T1\_Ext\_X= Time 1 externalizing score, T1\_SocSkil\_X = Time 1 social skills score, ChangeExt\_X = change in Externalizing score, ChangeSocSkil\_X = change in social skills score, Dep/Anx\_X = depressive and anxious symptoms score, Change\_ProbSolv = change in problem solving score, Change\_PosInv = change in positive involvement score, Change\_SkillEnc = change in skills encouragement score, Tx\_Satis\_X= treatment satisfaction, T3\_Ext\_X = Time 3 externalizing score, T3\_SocSkil\_X = Time 3 social skills score.

Table 2 a

*Predictors of improvements in parent-reported externalizing score\**

<i>Child-level factors</i>	<i>Estimate (β)</i>	<i>S.E.</i>	<i>Est./S.E.</i>	<i>P-Value</i>
Age	0.069	0.058	1.194	0.232
<b>Gender</b>	<b>0.126</b>	<b>0.062</b>	<b>2.042</b>	<b>0.041</b>
ADHD-Co	-0.005	0.076	-0.070	0.944
Early_health_risk	0.093	0.066	1.419	0.156
<b>W1_extern_parent</b>	<b>0.416</b>	<b>0.062</b>	<b>6.700</b>	<b>0.000</b>

  

<i>Family-level factors</i>	<i>Estimate (β)</i>	<i>S.E.</i>	<i>Est./S.E.</i>	<i>P-Value</i>
Civ_Status	-0.114	0.066	-1.727	0.084
Depress_Mother	-0.112	0.074	-1.519	0.129
Depress_Father	-0.030	0.082	-0.362	0.717
Change_Discipline	-0.002	0.091	-0.023	0.982
Change_ProbSolv.	-0.090	0.113	-0.801	0.423
Change_PosInvol.	0.132	0.145	0.912	0.362
Change_SkillEncour	0.037	0.106	0.346	0.729

  

<i>Therapy-level factors</i>	<i>Estimate (β)</i>	<i>S.E.</i>	<i>Est./S.E.</i>	<i>P-Value</i>
<b>Hrs_therapy_Mother</b>	<b>-0.241</b>	<b>0.095</b>	<b>-2.553</b>	<b>0.011</b>
Hrs_therapy_Father	0.078	0.057	1.364	0.173
<b>Hrs_therapy_Child</b>	<b>0.236</b>	<b>0.073</b>	<b>3.219</b>	<b>0.001</b>
<b>Tx_satisfaction_Therapist</b>	<b>0.204</b>	<b>0.081</b>	<b>2.510</b>	<b>0.012</b>
Tx_satisfaction_Mother	0.020	0.080	0.251	0.801
<b>Thearpy_alliance_Mother</b>	<b>0.163</b>	<b>0.080</b>	<b>2.045</b>	<b>0.041</b>

Table 2 b

*Predictors of improvements in teacher-reported externalizing score\**

<i>Child-level factors</i>	<i>Estimate (β)</i>	<i>S.E.</i>	<i>Est./S.E.</i>	<i>P-Value</i>
Age	-0.017	0.064	-0.259	0.795
<b>Gender</b>	<b>0.168</b>	<b>0.060</b>	<b>2.796</b>	<b>0.005</b>
ADHD-Co	-0.048	0.071	-0.676	0.499
Early_health_risk	0.054	0.059	0.926	0.354
<b>W1_extern_teacher</b>	<b>0.543</b>	<b>0.061</b>	<b>8.937</b>	<b>0.000</b>

  

<i>Family-level factors</i>	<i>Estimate (β)</i>	<i>S.E.</i>	<i>Est./S.E.</i>	<i>P-Value</i>
Civ_Status	-0.059	0.067	-0.876	0.381
Depress_Mother	0.069	0.066	1.043	0.297
Depress_Father	0.005	0.085	0.064	0.949
Change_Discipline	0.028	0.105	0.268	0.789
Change_ProbSolv.	-0.145	0.123	-1.178	0.239
Change_PosInvol.	-0.188	0.137	-1.371	0.170
<b>Change_SkillEnc.</b>	<b>0.214</b>	<b>0.111</b>	<b>1.927</b>	<b>0.054</b>

  

<i>Therapy-level factors</i>	<i>Estimate (β)</i>	<i>S.E.</i>	<i>Est./S.E.</i>	<i>P-Value</i>
Hrs_therapy_Mother	0.023	0.076	0.306	0.760
Hrs_therapy_Father	-0.130	0.080	-1.634	0.102
Hrs_therapy_Child	0.019	0.077	0.241	0.810
Tx_satisfaction_Therapist	0.037	0.076	0.482	0.630
Tx_satisfaction_Mother	0.000	0.100	0.000	1.000
Thearpy_alliance_Mother	0.019	0.076	0.245	0.806

\*We also ran the models entering changes in aggression and delinquency as separate dependent variables. Findings were similar to those using the full externalizing scale, though with aggression showing somewhat more change over time.



Table 3 a  
*Predicting improvements in parent-reported social skills scores*

<i>Child-level factors</i>	<i>Estimate (β)</i>	<i>S.E.</i>	<i>Est./S.E.</i>	<i>P-Value</i>
Age	-0.072	0.064	-1.129	0.259
Gender	0.108	0.066	1.635	0.102
<b>ADHD-Co</b>	<b>-0.121</b>	<b>0.056</b>	<b>-2.186</b>	<b>0.029</b>
Early_health_risk	0.072	0.058	1.250	0.211
<b>Parent_Social_1</b>	<b>-0.347</b>	<b>0.053</b>	<b>-6.601</b>	<b>0.000</b>
<i>Family-level factors</i>				
<i>Estimate (β)</i>	<i>S.E.</i>	<i>Est./S.E.</i>	<i>P-Value</i>	
Civ_Status	-0.058	0.066	-0.879	0.379
Depress_Mother	0.007	0.072	0.097	0.923
Depress_Father	0.037	0.073	0.508	0.612
Change_Discipline	0.072	0.083	0.863	0.388
Change_ProbSolv.	-0.086	0.110	-0.781	0.435
Change_PosInvolv.	-0.063	0.141	-0.447	0.655
Change_SkillEnc.	0.155	0.094	1.655	0.098
<i>Therapy-level factors</i>				
<i>Estimate (β)</i>	<i>S.E.</i>	<i>Est./S.E.</i>	<i>P-Value</i>	
<b>Hrs_therapy_Mother</b>	<b>-0.200</b>	<b>0.088</b>	<b>-2.265</b>	<b>0.024</b>
Hrs_therapy_Father	-0.094	0.070	-1.347	0.178
Hrs_therapy_Child	0.092	0.072	1.292	0.197
<b>Tx_satisfaction_Therapist</b>	<b>0.138</b>	<b>0.066</b>	<b>2.071</b>	<b>0.038</b>
<b>Tx_satisfaction_Mother</b>	<b>0.189</b>	<b>0.072</b>	<b>2.622</b>	<b>0.009</b>
Therapy_alliance_Mother	0.062	0.079	0.782	0.434

Table 3 b  
*Predicting improvements in teacher-reported social skills scores*

<i>Child-level factors</i>	<i>Estimate (β)</i>	<i>S.E.</i>	<i>Est./S.E.</i>	<i>P-Value</i>
Age	-0.020	0.067	-0.296	0.767
<b>Gender</b>	<b>0.193</b>	<b>0.073</b>	<b>2.627</b>	<b>0.009</b>
ADHD-Co	-0.050	0.059	-0.852	0.394
Early_health_risk	0.058	0.059	0.985	0.324
<b>Teacher_Social_1</b>	<b>-0.520</b>	<b>0.054</b>	<b>-9.713</b>	<b>0.000</b>
<i>Family-level factors</i>				
<i>Estimate (β)</i>	<i>S.E.</i>	<i>Est./S.E.</i>	<i>P-Value</i>	
Civ_Status	-0.047	0.073	-0.640	0.522
Depress_Mother	-0.024	0.101	-0.235	0.814
Depress_Father	-0.034	0.107	-0.318	0.750
Change_Discipline	-0.127	0.070	-1.824	0.068
Change_ProbSolv.	0.017	0.115	0.148	0.883
Change_PosInvolv.	-0.067	0.128	-0.524	0.600
Change_SkillEnc.	0.145	0.099	1.463	0.144
<i>Therapy-level factors</i>				
<i>Estimate (β)</i>	<i>S.E.</i>	<i>Est./S.E.</i>	<i>P-Value</i>	
Hrs_therapy_Mother	0.109	0.097	1.121	0.262
Hrs_therapy_Father	-0.055	0.066	-0.842	0.400
Hrs_therapy_Child	-0.071	0.073	-0.974	0.330
Tx_satisfaction_Therapist	0.114	0.067	1.701	0.089
Tx_satisfaction_Mother	-0.097	0.097	-1.000	0.317
Therapy_alliance_Mother	0.021	0.090	0.239	0.811

Note: Significant predictors, at  $p < .05$ , are highlighted.